

0590
07/8

OIPE

#2

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/899,495

DATE: 07/20/2001
TIME: 14:25:47

Input Set : A:\00188US1.ST25.txt
Output Set: N:\CRF3\07202001\I899495.raw

3 <110> APPLICANT: Benjamin, Christopher W.
4 Roberts, Steven L.
5 Karnovsky, Alla M.
6 Ruble, Cara L.
8 <120> TITLE OF INVENTION: Human Ion Channels
10 <130> FILE REFERENCE: 00188US1
C--> 12 <140> CURRENT APPLICATION NUMBER: US/09/899,495
C--> 12 <141> CURRENT FILING DATE: 2001-07-05
12 <150> PRIOR APPLICATION NUMBER: 60/215,815
13 <151> PRIOR FILING DATE: 2000-07-05
15 <150> PRIOR APPLICATION NUMBER: 60/216,481
16 <151> PRIOR FILING DATE: 2000-07-06
18 <150> PRIOR APPLICATION NUMBER: 60/216,479
19 <151> PRIOR FILING DATE: 2000-07-06
21 <150> PRIOR APPLICATION NUMBER: 60/216,482
22 <151> PRIOR FILING DATE: 2000-07-06
24 <150> PRIOR APPLICATION NUMBER: 60/217,096
25 <151> PRIOR FILING DATE: 2000-07-10
27 <160> NUMBER OF SEQ ID NOS: 125
29 <170> SOFTWARE: PatentIn version 3.0
31 <210> SEQ ID NO: 1
32 <211> LENGTH: 443
33 <212> TYPE: DNA
34 <213> ORGANISM: Homo sapiens
36 <400> SEQUENCE: 1

ENTERED

```
37 ttccctgccta gtgttctggc tgctctcgag gcctcctgct tgactgttag cctggggctt      60
39 accttctttc ctctcctgct ttccgaatcg catgtttccc tctttcttga tttattcgct      120
41 tatttttggtg gaacacatct ccagtatctt cctaggaaaa ggaacatggt agatcaattt      180
43 ttcaaattct tgcatgtctg atttattctc tcttcatact tgattggtag ttttgatacc      240
45 aaattctagg ttgaaaataa ttttcacttg gaattttaaa ggcatttatt cctccattgt      300
47 cttctagggt ccagcattgc tattgaggac tctgatgaca ttttcttttt ctttttttct      360
49 ttaggctctg gaaactttta ggcattcttc ctttaataaca gtgtcctgaa tttcacactg      420
51 atgtgcctta ggacgggtct ttt                                     443
```

```
54 <210> SEQ ID NO: 2
55 <211> LENGTH: 509
56 <212> TYPE: DNA
57 <213> ORGANISM: Homo sapiens
59 <400> SEQUENCE: 2
60 ctttgtagct gtcacttgca gtgtgggaca gctgcacaag ggcccagcat gtctgtgtgt      60
62 ttaccagagg gactgccgca tggctcatgc tgagcagaag ctgatggacg accttctgaa      120
64 caaaacccgt tacaacaacc tgatctgccc agccaccagc tcctcacagc tcatctccat      180
66 cgagacagag ctctccctgg cgcagtgcac cagtgtggta agtgcagagg gcacctgtgg      240
68 ctgaggetca gatgaagagg cagctcatgc ccaagcctca agcaatcaat gtccagagga      300
70 atgaaatgac cagagttgac ttagactcac caatacgtgg cggggaggct ggaggaaggt      360
72 ccctgagggt tataggtgtc caatatttaa tgaggtcatg gttttcttaa caaagaagaa      420
74 atgagggtgg gagcgggatc accactggct aggcagccaa tgggcctgca tagactctgc      480
76 tcagctgagt ctccagcacg actataagc                               509
```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/899,495

DATE: 07/20/2001

TIME: 14:25:47

Input Set : A:\00188US1.ST25.txt

Output Set: N:\CRF3\07202001\I899495.raw

```

79 <210> SEQ ID NO: 3
80 <211> LENGTH: 534
81 <212> TYPE: DNA
82 <213> ORGANISM: Homo sapiens
84 <400> SEQUENCE: 3
85 gaaaaggaat gttattgatg aatttttgaga taatttttgt atatagcata gggtaaggaa      60
87 aagagagggtg taaaggatta gagatcagtc ttagaatgta cctgggtggac acaactctcc      120
89 caaagggcta tggtccatt gctgtgtgcc aattgattga tcatgaagtt tgatggttgc      180
91 agctgagcta ggtacgacct gtggggacaa agcagggaact ggcatgagtg gcttcagat      240
93 ctacccatt acaagatcaa tctcacattc cattccccca agcctccaaa attagacaga      300
95 acttgcatct ttctccagt tctaaaactc aaccatttgt ttgtgctcat ctttgtctct      360
97 ttgtcccat gcccccagcc tgtggcaact accattctac tgtctgttcc tatgaattta      420
99 actactctac atacttcata taaatggaga catacagtat tttatggttt tcttgaggct      480
101 ggcatatttc aattagcata aaatcatcac gatccatcca ttcggtacca tgca          534
104 <210> SEQ ID NO: 4
105 <211> LENGTH: 595
106 <212> TYPE: DNA
107 <213> ORGANISM: Homo sapiens
109 <400> SEQUENCE: 4
110 aaggggatct gtgctgagac cgggagtctg aagttcaggt tctgacctg ccactaacca      60
112 accattggag ggacattctt gggcctcagt ttctcatct gtaaagccct ggtgattctc      120
114 gagagttctt cacacttctt tgtagacaga cgccggggct caggcaagaa agcctacgt      180
116 aataagcagc cccaggggaa gccagcagca ggggcccttc cctcctggct aagaaaactg      240
118 ccactgggga gaagaggagg agagcccagg cctagctctg aacgtacctg atgtcacttc      300
120 cctccctgg tccacagttc cagcagattc actccagcat tttaggattc tgcgagattt      360
122 gtctgagggg cctgatttat aggagagagg aggccagact tgccccctcc ttaccgact      420
124 taggatggta aagcaacttg ggaaaagcat ttactctcag ctcccgaat tacccttcac      480
126 tttcctggca gataaatggg gcaaaacaga agatgcagtt acatttaaatt ggagcgaggc      540
128 aggtggaagt ttataagatt tgaatacact ttttggtgc ttttgaatat tcatt          595
131 <210> SEQ ID NO: 5
132 <211> LENGTH: 341
133 <212> TYPE: DNA
134 <213> ORGANISM: Homo sapiens
136 <400> SEQUENCE: 5
137 cttcttctct taggaaaatg cacatcattt tttaggtgct gagacagagg actaagaaat      60
139 caatgacata aaaatgcata ctttaatat tttcttttaa aactattatc ctaagggtgc      120
141 ctacatacta taatttataa gtatctggaa gagtgaaaac aattttattg aggccttgta      180
143 aaatatggca ggtgcctagg acctcatgga actcaggtat cttcagtagg atgtgaaaca      240
145 tcacatcatg gggcgtggtg cagtgtaaag aggtaaagaa aagccagttc ttccacatgt      300
147 aaactacttg aactccattt catctttttt cataccatct c          341
150 <210> SEQ ID NO: 6
151 <211> LENGTH: 241
152 <212> TYPE: DNA
153 <213> ORGANISM: Homo sapiens
155 <400> SEQUENCE: 6
156 cagacgggga gtcagtactt gagaagaccc ggaaggcggg gagcacttgg actccagacg      60
158 gggagtcagt actgagagac ccggaaggct gggagcactg gactccagac ggggagtcag      120
160 tactgagaga cccggaaggc tgggagcact ggactccaga cggggagtca gtacttgaga      180
162 gaccagaag gcggggagca cccgaagact ccacaccggg gagtcagtac tgagagaccc      240

```

RAW SEQUENCE LISTING

DATE: 07/20/2001

PATENT APPLICATION: US/09/899,495

TIME: 14:25:47

Input Set : A:\00188US1.ST25.txt

Output Set: N:\CRF3\07202001\I899495.raw

```

164 g 241
167 <210> SEQ ID NO: 7
168 <211> LENGTH: 521
169 <212> TYPE: DNA
170 <213> ORGANISM: Homo sapiens
172 <400> SEQUENCE: 7
173 ggacacctgg cacggggcct'gtgcgtgcgg gaaagagggg agccctgtgg gcagtccagg 60
175 ccacctgagt tatctcctag ccccagtcg cctgaaggag gggctggccc cccagcgggc 120
177 ccttgccacg agccacgatg tctgtgccgc caggaagccc tactgcacca cgtagccacc 180
179 attgccataa ccttcgcgag ccaccgagct gccagcgcgt gccatgagga ctggaagcgc 240
181 ctggcccgtg tgatggaccg cttcttctct gccatcttct tctccatggc cctggtcatg 300
183 agcctcctgg tgcctgtgca ggcctgtga gggctgggac taagtcacag ggatctgctg 360
185 cagccacagc tctccagaa agggacagcc acggccaagt ggttgctggg ctttgggcca 420
187 gccagtctct cccactgct cctaagatcc tgagacactt gacttcacaa tccacaaggg 480
189 agcactcatt gtctacacac cctaactaaa ggaagtccag a 521
192 <210> SEQ ID NO: 8
193 <211> LENGTH: 624
194 <212> TYPE: DNA
195 <213> ORGANISM: Homo sapiens
197 <400> SEQUENCE: 8
198 ttttgttccg ttacacttcc aattttggac ttctttgtgt agttttacaa gagggatatc 60
200 tcttttaaaa aaaaaaagca caacaaattc cacacacaaa atataagtac aaatcagctc 120
202 tctgcatgag tgggtctcca tctcttgctt aaccaacagc tgatggaaaa tattccgggg 180
204 ggcagtgggg agagctgaca atgcataaat aaaaataata taaataaaaa ccaatatagt 240
206 ataacaacta ttgcgatagc attacactgt attatgtata taagtaatct aaagatgatt 300
208 tcaagtatac ggggcatgac gcatactttc tcattttata taaggaaactt gagcatcact 360
210 ttttggtatt gggggtaggc cctagaacct attccccctt gtttccaagg caagactttg 420
212 tataaattgc gtgacatatt aaatgtaatt ttaaaaacct ggtaacattt tccgagttcc 480
214 acaatggcag cattttcagg atttttagcct aacctttaac ctaacaaaat actatgatac 540
216 ttcttgaggg tagttttatt tttaaataat ttcccttttc catttggtta gaaacatctt 600
218 ggtgtttatg aataaactta atgc 624
221 <210> SEQ ID NO: 9
222 <211> LENGTH: 443
223 <212> TYPE: DNA
224 <213> ORGANISM: Homo sapiens
226 <400> SEQUENCE: 9
227 cctctaggcc agggcccca gtgctgagct gggcagggaa caggactcag ccctggatag 60
229 tgcctgggtc tctgctgctg ttctttcaac acagcgcctc ccctgaggtg atgcattgcc 120
231 ctccccccag gacatcctgc gatacacaat gtccctccatg ctgctgctta ggctgggtgag 180
233 ctccatgccc tggggagggt ggatgggaaa gccagctga gtccagctca gaactaccag 240
235 ccttcatcaa catgctgagc ttaggggcat ggatatgttg agagcaggag cctcagtggg 300
237 gcccttggtg cccagtcctt ggcctggcac tgcctgggcc tggaaacta gtgcacccc 360
239 gcggcacgcc atcacgtgc cctgggagtc tctctggaca ccaaggctca ccatcctgga 420
241 ggcgtaagtg agacagtccc tgc 443
244 <210> SEQ ID NO: 10
245 <211> LENGTH: 563
246 <212> TYPE: DNA
247 <213> ORGANISM: Homo sapiens
249 <400> SEQUENCE: 10

```

RAW SEQUENCE LISTING

DATE: 07/20/2001

PATENT APPLICATION: US/09/899,495

TIME: 14:25:47

Input Set : A:\00188US1.ST25.txt

Output Set: N:\CRF3\07202001\I899495.raw

```

250 aattgaagga ttagaaaata atgttagaga aaaacctacc agaacaacaa aaaagaaatg      60
252 aaacatagga gagaaatata agaaaactag aggatcaatg cacaaaggcc gacagtggat      120
254 tggaatatta agagttccaa aaagagaaca gaggaaaaga tgaggaagaa attaaggatg      180
256 aactaaccgt aagaaaatTT gccaaaacag agaatgagtc ttcaatgcta aaaggTTgac      240
258 tgagttccca aaaaagaccc gtcctaaggc acatcagtgT gaaattcagg acactgttat      300
260 taaggagaag atcctaaaag tttccagagc ctaaagaaaa aaagaaaaag aaaatgtcat      360
262 cagagtccct aatagcaatg ctggaaccta gaagacaatg gaggaataaa tgcctttaaa      420
264 attccaagtT aaaattatTT tcaacctaga atttggtatc aaaactacca atcaagtatg      480
266 aagagagaat aaatcagaca tgcaagaatt tgaaaaattg atctaccatg ttctttttcc      540
268 taggaagata ctggagatgt gtt                                     563
271 <210> SEQ ID NO: 11
272 <211> LENGTH: 485
273 <212> TYPE: DNA
274 <213> ORGANISM: Homo sapiens
276 <400> SEQUENCE: 11
277 ctggaaggt ccacgcgtg gctgaactgc aaccacagct ccactgagtg ctgcttctgg      60
279 gcctcgtgtt cccgctgggc ccttgtccat tctgagcccc ctgtcagctc tgcctccgca      120
281 gggcccgcca tctgccctgc tgatacctct ggctccttca cacctacaga aagacagaga      180
283 ctacagccatg ggctgcaaat gtcacctgtg gagggaggga gacagggaag gaggcaggag      240
285 cagagaagtT gaggtggggg aagaggaatg tgacttccct caccgggcag gtgggtgggg      300
287 ggtgagaccc gggcccttat tttccttctg gggcgagtg ggacagcatc tccccgggct      360
289 gttgcagtgg agcagcaggg agtgaggcca ccgaggcagg ggtgggggct ggggtggtggc      420
291 cacgtgcagc aggtgggtga tgaagatggt ctccagcagg ctgccacca tcagggacag      480
293 gcaca                                     485
296 <210> SEQ ID NO: 12
297 <211> LENGTH: 527
298 <212> TYPE: DNA
299 <213> ORGANISM: Homo sapiens
301 <400> SEQUENCE: 12
302 tagatgataa ttacggcttt ttttttttgt ggtttttatt tgaaaactcg tatgatctat      60
304 aaccttcgcc gggagtgate tgccgccact agggcgagc agatagctca ggggagactg      120
306 acgtcatcta ctactcatc atctgccgga aatcacaaac atcatggttc cctgcgtgct      180
308 catctcaggc ttggtgctgc tagcctactt cctgcgggct gcctcaccag agcctgggca      240
310 ctgccgcccc ggagatacgc tgctgtgggg atgccgtgaa ctctgtggcc aagaacatga      300
312 gagggcagga cagagaggc caggacgcca tcggcgaggT tggacaggag ccagaggcgg      360
314 atggagcgcg gcagaggcgc cccactgtc tcccgTgcca ctggtcctg cagctgcccc      420
316 ttttaaggact gtttgtgccg acccttcccc aggaagtTgac ggcattctgt tctgggtcgc      480
318 tcgggtgctc ttacgcctgg gctccaacct tatctcatcg tggccta                                     527
321 <210> SEQ ID NO: 13
322 <211> LENGTH: 451
323 <212> TYPE: DNA
324 <213> ORGANISM: Homo sapiens
326 <400> SEQUENCE: 13
327 atgacagtac caaagcgcg cctcagaaat atgagcaact tctccatata gaggacaacg      60
329 atttcgcaat gagacctgga tttggaggTg agtattatcc tctcaaaatt catttcaaaa      120
331 cccattgcac tTcaaaaatg gaggtgaaaa tttaaaacaa gacaaaaatg caagtaaagt      180
333 ccatcagttt aaaacaaaaa aagaaggctt ttacaatcac cttctcttta atgagaacaa      240
335 ttgatgagtt atccatttta aattgaccaa aaaaactcat tttcctacta tgcacactgt      300
337 agtaaatagt atgtgttcca taaatacgag aatggatata tgttgcttat acaccaactt      360

```

RAW SEQUENCE LISTING

DATE: 07/20/2001

PATENT APPLICATION: US/09/899,495

TIME: 14:25:47

Input Set : A:\00188US1.ST25.txt

Output Set: N:\CRF3\07202001\I899495.raw

```

339 atttttctaac taaaaatcct taaattggat acatgggttat ttataaaatc ttattgaata      420
341 ttcttatgag ctagaaatgc catgctttgg g      451
344 <210> SEQ ID NO: 14
345 <211> LENGTH: 524
346 <212> TYPE: DNA
347 <213> ORGANISM: Homo sapiens
349 <400> SEQUENCE: 14
350 cccacaaggg tctgttgtcc accccgcgtg gaccgcccag gccggtggga gtcaaaaaag      60
352 ggggaggggc gggggatctt ccactttctc accccgagtt tctttgcttg cttgccccga      120
354 gtatctgtca agaggcagcc ctctccccta aaggcccctt catcctgaac gtgcatgatg      180
356 cccctgcagt gacaaataca gaatcttagg gggcctggat tcgaggccga gctaatact      240
358 ggggttgcgc ggggtggtag gttattttaa ccacctggaa atcagtttct ctgggttatg      300
360 gggattgtac ctggctcact ggatttgagg agtaaccaga ttttaggaca gactctttct      360
362 ctgtccgtcc tactcagatc ccagtaggaa acttaccctt cccctgcgcc acggagtgca      420
364 aagaaaacag cccaaagact tctttaacga ctctggatcc ctcagccaga tcacggatat      480
366 ggaaaaagct taaattagaa agaggaggtc gtgaagggac ctcc      524
369 <210> SEQ ID NO: 15
370 <211> LENGTH: 501
371 <212> TYPE: DNA
372 <213> ORGANISM: Homo sapiens
374 <400> SEQUENCE: 15
375 agactcagct gagcagagtc tctgcaggcc cattggctgc ctageccagt gtgatctcgc      60
377 tcccaccctc atttcttctt tgttaacaaa accatgacct cattaaatac tggacaccta      120
379 taaacctcat ggacctctct ccagcctccc caccgtgtac cggtgagtct aagtcaactc      180
381 tagtcatttc attcctctgg acattgactg cttagggtct gggcatgagc tgcctcttca      240
383 cgtgagcctg agccacaggt accctctgca cctaccacgc tgatgcactg ggccagggag      300
385 agcgccgtct ggatggagat gagctgtgag gagctgggtg ctgggcggat caggttggtg      360
387 taacaggttt tgttcaaaag gtcgtccatc aatttctgct cggcatgggc catgcggcag      420
389 tcccctgggt aaacacacag acatgctggg cccttgtgca gctggctccc actgcagctg      480
391 acagctatga agcaggagct g      501
394 <210> SEQ ID NO: 16
395 <211> LENGTH: 664
396 <212> TYPE: DNA
397 <213> ORGANISM: Homo sapiens
399 <400> SEQUENCE: 16
400 gtgggcaggg cgggggaggg agggacatgg ctgtagccgt ggagatggga ggacagacag      60
402 gacttggttg ccacttggtt gaaccaaggg aggggtcagg aagagacacc cagttttgta      120
404 tcagatgtgt agagcgtggg atgctgttca ttgattgagg gaggaggagg aggaagaggt      180
406 atggcatggg aggaggtagc tgagctctgt catgaatgtc atttgaagtc cccagggaga      240
408 gccaggccgg ccagcccctt cactgcttta gccagctctc aggggtgtctg tgctccctgg      300
410 cctctctcagc tctgtcttca tagctgtcaa ctgcagtggg ggacagctgc acaaggacca      360
412 agcaggctctg tgtgtttacg cagggttctg ccgcatggcc ctgccgagca gaagctgatg      420
414 gacgaccttc tgaacaaaac ccgttaccac aacctgatcc gccagccgc cagctcctca      480
416 cagctcatct ccatcgagat ggagctctcc ctggcccagt gcatcagtgt ggtaggtgca      540
418 gagggcacct gtggctcagg ctcaggcgaa gaggcagctc atgcccgaag ccaaagcaat      600
420 caatgtccag aggaatgaaa tgactagagt tgacttagac tcaccaatac attggcgggg      660
422 aggc      664
425 <210> SEQ ID NO: 17
426 <211> LENGTH: 628

```

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/899,495

DATE: 07/20/2001

TIME: 14:25:48

Input Set : A:\00188US1.ST25.txt

Output Set: N:\CRF3\07202001\I899495.raw

L:12 M:270 C: Current Application Number differs, Replaced Current Application No

L:12 M:271 C: Current Filing Date differs, Replaced Current Filing Date